

**Research, Engineering and Development Advisory Committee
Federal Aviation Administration, Bessie Coleman Room
800 Independence Avenue, SW, Washington, DC**

Meeting Minutes

On September 14-15, 2004, the Federal Aviation Administration's (FAA) Research, Engineering and Development Advisory Committee (REDAC) met in the Bessie Coleman Room at FAA Headquarters. Attachments 1 and 2 provide the meeting agenda and attendance.

Welcome and Introductory Remarks

Dr. John Hansman (Vice Chair) and FAA's Joan Bauerlein (REDAC Executive Director) welcomed the members. After reading the public meeting announcement, new members were acknowledged and FAA Administrator, the Hon. Marion Blakey was introduced.

Remarks - Honorable Marion Blakey

Ms. Blakey welcomed and thanked the committee for its past and current contributions. She additionally commended Dr. John Hamry for the input on the National Plan.

She stated that the Joint Planning and Develop Office (JPDO) and the National Plan are of primary importance. We are mandated by Congress to present them with the first draft at the end of the year. The granularity of this report will be very important. We need to find the "holes" and the issues that need to be addressed. With a possible budget of \$3.5B for 2006, there are many questions that require answers.

The expected growth of passenger miles could be more than triple the current passenger miles. A three-fold increase is expected by 2025. The expectation is to achieve the transformation of the system and get the priorities assembled.

A very noticeable ATO wave of Air Traffic Controller retirements is expected over the next few years. The FAA will be hard-pressed to assure that by '07 the Agency has an acceptable number of Air Traffic Controllers. The committee agreed that the proper training is crucial to success.

The question of Iraq and the FAA role in future assistance was raised. Ms. Blakey stated that the FAA will not be investing large amounts of funding on this effort. The main role is to work with the country's Air Traffic Controllers, but we will not use FAA funding to assist.

Dr. Hansman inquired about the search for future controllers and the possible special "skill set" for these employees for about 20 years out.

- a- Training with regular updates will have to include the ability to convey the critical nature of these positions. Ideas are more than welcome on how to accomplish this mission.
- b- The FAA will address Congress this fall on the controller shortage and the training plan.

Dr. John-Paul Clarke commented that the EPA was not chosen to be a part of the JPDO. There needs to be a smoother coordination.

National Aviation Plan Update – Mr. Charlie Keegan

Mr. Keegan stated a slight transition was taking place and John Kern is still working with us. He stated the plan represents a very significant change, but the FAA will have to be able to accommodate. The delay buildup could be significant. The people will have to plan an extra day of travel. We need to accommodate new vehicles (UAV) even though they are not used here yet. We also need to look at microjets. This is a new way to travel and seems to be increasing in popularity. There needs to be a vision for security and how to deal with capacity and safety. There are about 6 different possibilities.

The FAA will be preparing a report in December. We have to do coordination facilitation with a number of agencies involved. The last three weeks we are breaking down the product into execution pieces. The demand for transportation is growing at the rate of 3-5 times the capacity of the system both systems.

Mr. John Douglass asked if there is a semi-realistic cost to this? Mr. Keegan replied that this would be the first thing they are going to look at. Many plans have been discarded due to funding, however the fact is that despite the major cost incurred there will be an equally major return for the investor's.

Mr. Keegan reported that the civilian side is coping with it. One of the lacking things is as one single agency (FAA), we do need help. Where we are driven will be determined by our research. Mr. McCullough there are difficulties in getting high level people to participate. On October 7th there will be a meeting and will be happy to report back to Charlie and the committee.

ATO Update

Ms. Joan Bauerlein gave this report since Mr. Steve Brown was not available. Mr. Chew has been briefing the business plan. Mr. Chew will be visiting the public aviation community in the coming weeks.

The executive counsel has been creating a strategic counsel and balance “scorecard.” The directors and Ms. Bauerlein are starting to work with the operations and planning. The R&D is developing a new structure with NASA (ATO) - the relationship is closer yet we are still looking at how the pieces could play together. The executive committee needs to meet again (it has been three years). How does one transition one into the operating environment? Mr. Amr ElSawy of MITRE will address this in a briefing this afternoon. The outcome could give us the necessary information and some suggestions. These recommendations will be welcome.

Weather-- is a hampering the “metric” that has been set up. How do we normalize the convectives for this? Ms. Bauerlein is working on this with the policy and the weather research program. Work is also being done on the science of weather and its products. The commercial airlines are using them. An internal coordination board will be put into place for weather research and products. There is a great platform for near-term requirements. All support is welcome but the transition of the operating environment is most important.

RECOMMENDATION Mr. Thompson help form a subcommittee to conduct weather research and products.

Loretta Martin has been asked by Mr. Chew to find out near- term weather problems. There are many pieces, now it is just necessary to find a way to put them together.

Safe flight 21 produced a report for use of CDTI for approach at airports to examine the capacity of visual approach at airports. The amount of time for single arrival stream for visual approach is approaching 10-15% of the year and in some places, might be as high as 25% of the year.

Ms. Bauerlein responded that research has been done on marine fog in the west coast area. We were able to release aircraft 45 minutes in advance. We try to get a high degree of certainty that these results are going to be constant.

Dr. Hansman asked about the additional buffers. It appears that the visual portions are problematic and this might be a human factors issue. Mr. Thompson mentioned that the FAA needs to review because we seem to feel it is overstated. We should take all the new technologies available and add these in.

Discussion REDAC Strategic Direction and Program Guidance – Ms. Woodie Woodward , Ms. Sharon Pinkerton, Ms. Peggy Gilligan

Ms. Peggy Gilligan, stated there are two things that are facing us now:

1) NASA Initiative and the industry- collecting data – Flight Operations Quality Assurance Program (FOQAP) collects data from aircraft operations to determine if they are acting as expected.

2) Aircraft Aviation Safety – that works with pilots. Sometimes anomalies and possible violations are reported. All reports are carefully reported and reviewed. The individual airlines usually only make the changes locally. We would like to see a process for integrating broader trends in operators. Protection of data and misunderstanding by the public are great concerns.

There is an advisory committee – they are integrating the data and NASA is helping to help identify important issues. There are organizations that are doing work in this area, and there are requirements and the information is needed immediately. FAA is interested in any information that could be shared. We need to see the broader trends within the next fiscal year. Protection of the data is of prime importance as well.

Legislation for the JPDO encourages a role for the R&D investment for all departments. We need to make sure that the planning is being done and the senior people are making the choices and carrying through. There are elements that are not directed to 2025. The FAA is concerned about aging aircraft and will try to bring safety to the attention of the table.

Dr. John Hansman is concerned about NASA protection of data and the public safety benefit. There is not yet a national system implementation.

An answer was there are two advisory committees and they are both industry – they are a 3rd party opportunity. Tools would be used by NASA to organize and keep the data and the technology alternatives. What tools can we use to coordinate the information? The Aviation Safety Program is currently holding the information.

Mr. Hans Weber raised the question of getting good cooperation with the pilots?

Ms. Gilligan replied that yes, the data is reliable. The personal reporting data, the data is reviewed by an employee representative for accurate and checks in the system for reliability.

Ms. Sharon Pinkerton stated noise is still a main issue, air quality and climate change is also a discussion that will be held at ICAO this fall with Mr. Chew.

Ms. Pinkerton's priorities have led her office to work with the best approach to reduce noise and emissions. They are also working with our Center of Excellence. Three main recommendations are: 1) interagency coordinating group to address air quality, noise and climate change; 2) metrics and tools - the subcommittee will be focused on the mitigation and how to study it for priority; and 3) operational and technological developments – a large test started last night with UPS for two weeks. The continuous descent approach test was successful on first try and they will continue to come in.

Dr. Hansman brought up that the EPA is not a player in the JDPO. Ms. Pinkerton will try to get them on board on their own.

Mr. Jerry Thompson stated some of the information has gone to the other agencies. We need to stay in touch with the fact that these issues are ours and not let the other agencies get this. The Grand Canyon is working with the FAA on the noise issue. Court decisions have eroded FAA authority and it is difficult but FAA continues to assert its authority.

Mr. Jim Crites commented that with closer communications between the EPA and FAA, the more understanding is achieved with the EPA, they will be receptive and not overly burdensome.

Ms. Pinkerton appreciated the advice and acknowledged that it is always best to start this at the beginning of the programs.

Ms. Peggy Woodward In 2005 the request was made for about 8.5 M budget. This is for tech center personnel. The additional \$1M was asked for lithium technology for pavement distress. We are trying to get the airport cooperative research project (that has not been funded in the past). There is not any funding in the '04, and we are looking for funds for '05. A rumor has been that the Senate may add funding, but that needs to be seen. In '06, \$20M would be needed for the entire program.

Ms. Woodward asked that in the future IPT meetings, that she be informed in order to be included. She would like to participate early in the agenda items and with the initial IPT set up. Mr. Marchi will report his afternoon on this area.

Ms. Woodward feels that the earmarks on the hill have been able to keep the cuts down. There is a constant communication with the staff and members. It is important to develop a relationship and improve it.

Ms. Joan Bauerlein commented that the TRB is doing a study for DOT and DOD and said we do the best we can.

RECOMMENDATION Ms. Woodward's recommendation of having the IPTS make a quick overview of their progress would benefit the entire group of all 7 IPTs. The other IPT leaders would benefit as well.

RECOMMENDATION Dr. Hansman will cover how the REDAC and JPDO work together

Presentation of Subcommittee Reports

In February and March 2004, the REDAC subcommittees reviewed current R&D investments and made recommendations on their respective portions of the FAA's portfolio. The Chairman (listed below) of each subcommittee presented recommendations to the Committee. Attachment 3 reflects the recommendations that were approved by the Committee and forwarded to the FAA Administrator.

Subcommittee on Air Traffic Services – Mr. Jerry Thompson

Subcommittee on Aircraft Safety – Dr. Hans Weber

Subcommittee on Airports – Mr. Richard Marchi

Subcommittee on Environment and Energy – Dr. John-Paul Clarke

Subcommittee on Human Factors – Dr. Colin Drury

Technology Transition – Mr. Amr ElSawy, MITRE

Mr. Amr ElSawy, commented that the transition should be a systematic change and therefore not to be overall concerned. Choices are going to need to be made. Structure may appear to be bad for some, however, it might be helpful to the system. The key point is that we are thinking about the system and where is it appropriate to talk about how to put the system together.

The following elements are needed:

- a) Collaborative and competitive
- b) Flexibility and Rigidity
- c) Unstructured and structured
- d) Autonomous and controlled and
- e) Strategic and tactical

What do we need to do to get buy in from the people? Part of the challenge is going to be the right balance and the right steps to take to get the balance right.

There must be a continuous learning process. The financial portion of this is also important. In some areas, we have great opportunities with automation and standardization and procedures come in.

We need flexibility in the system as well as accommodation in the system. The aircraft that are coming off the assembly line today will be present and part of the system for a long time. The production line now will be with us for a while.

Other topics discussed included: GPS, security, Nanotechnology and advanced Airframes Research. FAA needs to be involved with all of these technologies. All people are connected and all personnel would be involved. Network to provide storage. Applications can be developed over time. The investment strategies need to start to happen now. Finally the people and the platforms are added.

The Airport Self Separation Standard has now been approved and now we have to determine what applications can be used on it.

The next journey is tough and there will be surprises. The Roadmap Performance Based Navigation document that the FAA has done is an important tool to begin this project and highly recommended to be used for the program. We are trying to change the way we fly.

Finally, there are areas where technology transition will have to be dealt with one at a time

Mr. Clarke- How to allocate the resources? There are options if we look at them as investments in the future. Research programs need to be looked at for the future.

The system is in bad shape...we all have to think about how to pay for this. The major airlines are not in the best condition they have been in, so perhaps process and standards....there are some who want to add too many that will hinder the growth.

Dr. Hansman asked how does one identify those critical decisions? How are these items paid for?

Mr. El Sawy – we are paying either way, either in the aircraft and in the cockpit.
Mr. Clarke- need to focus on the growth, so you can estimate the outcome.

NASA's Aeronautics Research Program - Mr. Terry Hertz, NASA

Dr. Hansman said that in the past, REDAC and NASA have been trying to make a joint meeting, scheduling this year has not been possible, but next year, we will be working on that.

Mr. Hertz made his presentation and stated his briefing would be an overview of NASA's Aeronautics Research Program. NASA has been using a "Push/pull" model- user and then developed

Funding Sources

Taxpayers	Airframers
Congress	Engine Manufacturers
OMB	Airlines

We have to work to get the ultimate good for the taxpayer. The capability has a great deal to do with this. The program managers have been very good about this information.

There are three programs. Vehicles Systems is about 55% of the budget, then Aviation Safety and then Aviation Security.

The budget would be mainly procurements and operation of facilities. In 2004 went to full cost accounting. The total amount is almost double. There are 2,000 direct civil servants that are working on this work. There are another 1,000 in the services pool. 1/6 of NASA people (a total of 18,000) work this project.

Vision is to be a new blueprint. There is a website (www.aersopace.nasa.gov) that will provide a copy of the document.

There are 5 objectives:

- Protect travelers and public
- Protect environment (noise and nitrogen oxide and CO2)
- Increase mobility
- Partnership to the National security- working with DoD
- Explore Revolutionary Aeronautical Concepts

In addition, there are 3 integrated programs.

- Safety
- Security
- Environment and cost

The airspace concept evaluation has estimated future demand two times from where we are now. There are 15 planes in a sector. Many were above capacity in 2000, so there is only a guess as to how overwhelmed they must be now.

Strategic areas:

- 1) Protect the aircraft
- 2) Hostile act intervention
- 3) Human error avoidance
- 4) Environmental (weather) hazards
- 5) System Vulnerability Discovery and management

For the 2005-2006 the question becomes, “What can we do to identify the risks and mitigate those?”

Strategic Technical Focus Areas-

- a) Environmental friendly and clean burning engines to get to zero burning engines
- b) New engines
- c) Quiet aircraft
- d) Weight reduction and durability
- e) Smart aircraft
- f) Flight and system demos
- g) Strategic Technical Directions.

NASA Technology is in the public domain. The problem is how far to take that technology? We have more delays today than pre 9/11. There are many complex issues. We can work with our partners and try to do anything ourselves is not possible. Perhaps NASA could review an institutional review at “the top”.

Ms. Baurlein said there is some understanding but we are not able to get a better communication with the right people. Industry has been known to get tough with Government. We are in a new realm over the years. We invest more than what the whole world puts together. We need to get

more understanding outside the FAA in order to get what is needed. The defense if lost, will be disastrous.

Mr. Douglass- Part of the issue is that it is not important to do research on planes here in the U.S.

Dr. Hansman said that we need to figure out an argument for NASA so that they understand what the U.S needs. There needs to be a synchronization. There are technical reasons and other as to why. In the past 10-15 years, Europe has caught up to us. The issue is, do we care about what airplanes are produced where? And do we care what components are produced here or abroad?

Dr. Hansman inquired how NASA sees the JPDO affecting this program. The safety and vehicle programs are silent or not as interested in their outcome. We are looking at management and safety systems. We will need more supersonic vehicles and then on to the third phase.

Discussion – Committee Recommendation and Future Committee Activity - Dr. John Hansman

JPDO Advisory Committee that John Hamry is chairing is a subcommittee of the REDAC and will report through the REDAC. There is no executive committee to the REDAC. Their next meeting is October 1st.

RECOMMENDATION Currently, when the subcommittee makes a recommendation, the FAA makes a response, and in most cases, they are closed. Dr. Hansman recommended that the subcommittees track the FAA responses and make sure there are no further issues and that the action is “closed”. If there is an issue and if it remains, followup should be done and brought forward.

RECOMMENDATION The Ad Hoc Group on Technology Transition. This is a key issue and the ATS subcommittee has a group and is looking at this. We would like to task this to the subcommittee. Mr. Thompson reported that MITRE and NASA are working currently. February 8-10, 2005, a meeting is scheduled where the subcommittee will meet at AMES to discuss this subject. Dr. Hansman doesn't want a solution, but he wants to have issues and recommendations understood.

Mr. Ray LaFrey reported that they have been able to meet and will try to determine a Terms of Reference. Mr. Lebacqz mentioned that the NSTC subcommittee is also interested in this. It is important to find out what the barriers are and how we might be able to get them fixed.

Dr. Hansman mentioned there are times where the words are hard to find to describe what does go on so that the program can be acted on. The ATS Subcommittee Working Group on Transition Study will be a new study.

Ms. Sarah Dalton asked if the Air Traffic committee is taking on a broader role is that appropriate? Ms. Bauerlain reported that more concentration has been on the regulatory side and it will be good to have research on the air traffic side.

RECOMMENDATION Provide input on “skill set training issues” for air traffic and ask the Air Traffic Subcommittee to help the Human Factors Subcommittee work on this for

Ms. Blakey.

RECOMMENDATION Get briefings from the IPT's and their leads for the next meeting in the spring.

The Joint Meeting with NASA will be Sept 21st. and will be held in another location.

RECOMMENDATION Add to the next agenda - what the research process for the ATO will be in future. What and where will the future investment go?

RECOMMENDATION We oversee the research and development activities, but we also need to be aware of the facilities and equipment issues as well. Try to work out specific actions offline.

Ms. Christine Horne made an observation, beyond HF aspects -how do we change things and what is the resistance in changing? Mr. Ray LaFrey will be studying transition barriers showing that there are barriers and solutions.

Dr. John-Paul Clarke is concerned about JPDO staffing and if it will impact the rest of the agency. Do we need to pay attention to it and shall we ask for a report on this?

Dr. Hansman is not sure on how to ask for the information, but it would be helpful to know.

ACTION- Dr. Hansman took the action that the semantics of ATC Automation words to convey the intent of the cover letter will be crafted carefully.

ATO Update – Mr. Steve Brown

Mr. Steve Brown spoke on the ATO overview of the next few months. The resources on '05-'06 and the business plan is in a final draft form. Each service unit and the operating business costs will be revised. Recovery is underway and we must add capacity. In many revisions, we are working the OEP and the other plans surrounding it. All the items we discussed are being considered. Do more with less is currently in use.

We are trying to outreach to get stakeholder interest. There is an ATM advisory committee with RTCA within the next 2 months. The current flight plan for next year should be public by November 8th.

We are talking to NASA about research projects and plan to bring them into our operations and how can we change what we are doing? We would like to accomplish by the next year or two.

JPDO we continue to add resources from other programs to that plan. This is an important effort, and we need to define the permanent persons for the effort.

We have now set up the targets for the 2008 and 2009. We are trying to get more involved with what we are looking for long term. 80-90% we will be accountable for a higher level as we go. 7 months after the beginning the ATO, planning is beginning 3 years out and the FAA is making commitments 5 years out.

Dr. Hansman commented that the ATO has a short focus- JPDO has long focus- and other which is spread across. How will the R&D react and how will this change over time?

Mr. Brown reported that there are so many on-line priorities that Managers deal with today that have not been before. Continual input means to adjust your path. Funding profiles change with events (9/11) - if we had more information to take that insight and use it to help the FAA, I could do my job. I would make an effort to learn to help produce insightful advice.

Dr. Hansman thanked the members announced the next meeting is scheduled for April 12-13, 2005. He would draft the Committee's letter and forward to members for approval. Meeting was adjourned. Attachment 3 provides the Committee's letter to the FAA Administrator. .

**Research, Engineering and Development Advisory Committee
Federal Aviation Administration
Bessie Coleman Room, 800 Independence Avenue, SW Washington, DC
September 14-15, 2004**

Agenda

Day 1 – September 14

9:00 a.m.	Welcome and Introductory Remarks	Mr. Steve Brown, FAA Ms. Joan Bauerlein, FAA
9:15 a.m.	Comments	Hon. Marion Blakey
10:00 a.m.	National Aviation Plan Update	Mr. Charlie Keegan, FAA
10:30 a.m.	ATO Update	Mr. Steve Brown, FAA
10:45 a.m.	BREAK	
11:00 a.m.	Discussion – REDAC Strategic Direction and Program Guidance	Ms. Woodie Woodward, FAA Ms. Sharon Pinkerton, FAA Ms. Peggy Gilligan, FAA
12: 15 p.m.	Lunch	
	<u>Subcommittee Reports</u> – Presentation of Written Reports – Highlighting Strategic Issues for Future work by REDAC	
1:30 p.m.	Subcommittee on Air Traffic Services	Mr. Jerry Thompson
1:45 p.m.	Subcommittee on Environment and Energy	Dr. John-Paul Clarke
2:00 p.m.	Subcommittee on Aircraft Safety	Dr. Hans Weber
2:15 p.m.	Subcommittee on Airports	Mr. Richard Marchi
2:30 p.m.	Subcommittee on Human Factors	Dr. Colin Drury
2:45 p.m.	Break	
3:00 p.m.	Technology Transition	Mr. Amr ElSawy, MITRE
4:30 p.m.	Adjourn	

Day 2 – September 15

9:00 a.m.	NASA's Aeronautics Research Program	Mr. Terry Hertz, NASA
10:30 a.m.	Break	
10:45 a.m.	Discussion – Committee Recommendations and Future Committee Activity	Dr. John Hansman
12:00 noon	Adjourn	

Attendance

Members

Dr. John Hansman (Vice-Chair)
Dr. David Ashley
Dr. Michael Bragg
Dr. John-Paul Clarke
Mr. James Crites
Ms. Sarah Dalton
Mr. John Douglass
Dr. Colin Drury
Ms. Joan Bauerlein, REDAC Executive Director

Mr. Amr ElSawy
Ms. Christine Horne
Mr. Ray LaFrey
Dr. Victor Lebacqz
Mr. Arthur Lucas
Mr. Richard Marchi
Dr. John McCarthy
Mr. Carl McCullough

Mr. Paul Polski
Dr. Donald Richardson
Mr. Ronald Swanda
Mr. Jerry Thompson
Mr. David Wattrous
Dr. Hans Weber
Mr. Ronald Wickens
Mr. James Wilding

Other Attendees

Pat Lewis, FAA
John Rekstad, FAA
Cathy Bigelow, FAA
George Marania, FAA
Lourdes Maurice, FAA
Dell Ricks, NASA
Herm Rediess, FAA/NASA
Nick Stoer
Nelson Miller, FAA
Martin Pozesky, MTPA
Richard Oberman, House Science
Barry Scott, FAA
Gene Tighe, Rockwell
Frank Mangine, FAA
Claude Jones, FAA
Chis Seher
Ed Feddeman, House Science

George Greene, FAA
O.T. Blankenship, FAA
Jerry Newsom, NASA
Kelly Halverson, BAE
Chuck Johnson, NASA
Fenton Carey, FAA/BAE
Terry Kraus, FAA
Warren Fellner, FAA/Titan
Terry Hertz, NASA
Mark Rodgers, FAA
Doug Arbuckle, NASA
Howard Aylesworth, AIA
Roy Reichenbach, UMD
Randy Stevens, FAA
Randy Kenagy, AOPA
Sieg Poritzky

Paul Drouilhet, MIT/LL
Pat Marsha, GSC
Walter Hett, WHA
Mike Perie
Roger Stern, Lockheed
John Wiley, FAA
Jenny Kishiyama, NASA
Guinn Clark, Pagesus
Mark Cato, ALPA
Sharon Hayden, Lockheed
Andrew Lacher, MITRE
Mike Beavin, AIAA
Chuck Ruehle, FAA
Michael Basehore, FAA
Jim White, FAA
Robert Jacobsen, NASA

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November 15, 2004

The Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Administrator Blakey:

On behalf of the Research, Engineering and Development Advisory Committee (REDAC), I wanted to again thank you and the senior staff (Woodie Woodward, Sharon Pinkerton, Peggy Gilligan and Steve Brown,) for engaging with the committee at the September 14-15 REDAC meeting.

As part of our effort to make the REDAC a more effective and responsive body to support the FAA's mission, we have initiated action on three of the key issues which emerged in the discussions.

- An ad hoc group led by Ray LaFrey of the Air Traffic Services subcommittee has been tasked to address issues of technology transition, identify barriers to transition and recommend approaches to improve the transition process.
- The Human Factors subcommittee has been tasked with addressing issues related to the skills, training and needs of the next generation of the controller workforce in anticipation of upcoming retirement replacement.
- The JPDO advisory subcommittee led by John Hamre will continue to support the JPDO efforts.

In addition I have attached the specific recommendations of the REDAC subcommittees (Aircraft Safety; Environment and Energy; Air Traffic Services, Airports; and Human Factors), which have been endorsed by the full REDAC.

Thank you again for your interest and participation. I, and the other members of the REDAC, are available if you would like to discuss these, or other, issues in more detail.

Sincerely,

R. John Hansman
Co-Chair
FAA Research, Engineering and Development Advisory Committee

Recommendations for FY 07

Subcommittee on Airports

The committee was pleased to note that FAA has quickly initiated research projects that were requested at the last committee meeting in April. These included projects to evaluate the durability of polyurea paint, evaluate use of ICAO spacing standards on taxiway centerline lights as a means of reducing costs, and to investigate reports of severe intensity variations when different style lighting fixtures are used on the same taxiway lighting circuit. The committee supports a new FAA initiative to evaluate taxiway deviations of Design Group III aircraft at SFO in order to compare taxiway centerline tracking as a function of aircraft size.

The committee discussed need for FAA to accelerate the dissemination of preliminary research results in view of the lengthy publication cycle for formal reports. FAA agreed to send Committee copies of draft reports at the same time as the Technical Center provides the draft report to AAS at FAA Headquarters. These will be considered as preliminary reports for Committee information only.

The committee agreed with FAA that research on techniques for strengthening airport bridges to accommodate the A380 aircraft is not needed because of the routine nature of the engineering effort involved. The committee urged FAA to coordinate ongoing research of FOD-detecting radar with similar efforts underway in Vancouver and to review maintenance issues regarding the Engineered Materials Arresting Systems (EMAS) product developed under an earlier Cooperative Research and Development Agreement at the Technical Center.

Subcommittee on Aircraft Safety

1. Some key programs, each consisting of several projects, have unstable – and sometimes inadequate – funding. To guard against loss of critical research capability program funding needs to be strengthened and made more consistent.
2. Based on the SASO presentation at its most recent meeting, the subcommittee was concerned about the direction the project was taking. Subsequent to the meeting, some members dialogued with the FAA researchers and AFS. One member visited with the key academic researcher contributing to SASO to discuss his work. The subcommittee concludes that the academic research is being conducted by distinguished experts in the field who, however, need industry and FAA input and guidance to ensure that the research is properly taking into account industry and regulatory conditions and requirements. The selection of Part 137 as an early test of SASO methodology is a reasonable choice as long as Part 137 test results are not extrapolated to more complex Parts without considering differences between them.
3. An NPRM is in preparation for fire protection requirements on extended range cargo operations for up to six and one half hours. Research is required to identify means of compliance which would not impose an undue burden in terms of weight or range.
4. The time is approaching when the FAA must consider the certification implications of supersonic business jets and define the research necessary to support timely certification. Some potential technical issues are:
 - a. Landings based solely on synthetic vision.

- b. Tandem or side facing pilots seats.
 - c. Certification issues related to high-altitude emissions and supersonic flight over land
5. The SAS reviewed the proposal for a new national aircraft crash test facility. It advocates that the requirement be clearly defined in conjunction with the civil and military aviation communities to assure there is sufficient justification to replicate existing European capabilities in the United States.
 6. There are growing indications of a coming pilot shortage for carrier and business aircraft operations. By about 2007 this will be clearly manifest. Training and qualification of entering pilots and maintenance of their proficiency is a safety issue of great importance. Commercial pilot training and qualification standards need to be improved as necessary.
 7. As the number of aircraft being operated increases, especially with the introduction of new aircraft, so does the complexity and diversity of the technology deployed. This underscores the necessity to establish and maintain a sufficiency of well-trained, appropriately qualified AMTs in the U.S.
 8. The subcommittee, in general, is concerned about the steady decline in airline participation in safety-related research programs and projects.
 9. Regarding PMA certification, the FAA should investigate the safety implications of the recently introduced principle of “functional equivalency”.

Subcommittee on Air Traffic Services

ATS Subcommittee Recommendations On FAA/NASA Pursuit Of Major Core Technologies

The following are the ATS Subcommittee’s five specific research and development recommendations. While safety and security are high on our priority list, capacity and productivity are our focus:

ATC Automation

It is now time to undertake serious analysis and development of a system for automatically performing routine aircraft separation, traffic flow management, clearance generation delivery, and acknowledgement functions. This effort should establish optimum roles for pilots and controllers working with highly automated systems, as well as optimum methods for safety assurance and system reliability/availability.

A Seamless, Highly Fault-Tolerant System

Closely associated with the automation developments, but with a scope including the entire NAS ATM system, is the need for research and development to devise an integrated ATM system with less artificial separation between terminal, enroute, oceanic, and airport surface environments. An integral part of this work must be the development and implementation of a highly reliable, robust, and fault-tolerant ATM system. The resulting system may be distributed, centralized, or have some functions distributed and others centralized.

Weather Impacts to Aviation

The reduction, approaching elimination, of the effects of weather on flight safety and system and airport capacity is needed. An integrated FAA, NASA, NWS, DHS, and DOD weather research program modeled on the FAA Aviation Weather Research Program (AWRP), to effectively leverage the research work of all of the agencies is needed to develop this capability.

Wake Turbulence Separation Reduction Operational Enhancement

Techniques to minimize the additional wake turbulence separation, beyond radar or visual separation at congested airports, are critically needed. A Wake Vortex Avoidance System (WakeVAS) is needed, that predicts when weather conditions will produce “wake independent conditions” on arrival and departure paths. The current NASA – FAA initiative, which is consistent with recent MITRE-Lincoln Laboratory recommendations, should be better supported by the FAA.

Development of Rational Separation Standards

A serious research and development effort is needed to assess and rejustify current separation standards and develop methods to safely accommodate blunders. The study should consider the use of time-based separation as a possible alternative to distance based separation.

Subcommittee on Human Factors

At the August 24-25 Meeting at FAA/HQ, the Human Factors subcommittee reviewed one area of the Human Factors program in depth to examine the implications for Human Factors Integration issues. Three sample projects were briefed to the committee in the general area of Air Traffic Operations. This continued the theme of the previous meeting at FAA/TC on 2/3 March 2004. The aim was to use these projects to explore how well integrated the Human Factors expertise was into the overall mission of ATO. This theme was in response to our own push for long-term thinking in Human Factors, and to REDAC’s challenge to examine broader issues than specific allocation of funds in future budgets. From this analysis, the Human Factors sub-committee found a number of issues and opportunities as follows. All of these examples are from the one system element that we studied, but the committee’s conclusion is that they also hold for other elements.

Issues Discussed

1. The human operator in complex air traffic management systems is not going to disappear with increased automation. New systems will be blends of human and automated sensing, decision making and action execution. These are precisely the conditions under which novel forms of human and system error can arise, and will thus need Human Factors input.
2. Human Factors has had some successes, but success is not built into the process. There is still not a standard way for Human Factors to become involved early in system development and even non-standard means are not systematically applied.
3. Most of the technologies examined and evaluated from a Human Factors standpoint have arisen from a technology push rather than a system pull. These systems are the result of asking how can we use a new technology, or upgrade an existing one, rather than deriving technology (and Human Factors) needs from a systems analysis. In most industries, such a technology push has been found to be the least effective way of achieving meaningful change in a timely manner.

4. Perhaps because of the lack of systems pull, there have been some very long implementations of new technology and decision support tools, e.g. URET.
5. In the technology transfer process from development to field, human performance issues are not well controlled. The preferred route is for the FAA implementing office to start engagement with NASA at a Technology Readiness Level of about 3, but these TRLs are not clearly understood or defined. NASA and FAA seem to have quite different concepts of where on the TRL ladder specific project should be placed. Improvements here would help the human performance issues to be better integrated.
6. The FAA still lacks basic performance data on what ATC people do and how they do it. Such data is needed for future planning, both as baseline for error or throughput measures, and as a source of operational data for analysis to support continuous improvement. There are continuing issues of access to ATC personnel (as well as pilots and mechanics as noted in previous meetings) and of an often-changing political climate in this area. There is agreement among Human Factors professionals that if we did have better data, we could do a better job.
7. Budget reductions have created a narrowing of focus and eliminated the ability to address many research needs. The Human Factors budget is going down in constant dollars, and so tactical cuts have been made to ensure that the FAA Human Factors program can maintain its intellectual capability. What is happening in areas that are not in the current focus? Our review of specific projects and the near future plans generally endorsed the current mix of projects given the budget reductions, but we have concerns about the FAA's ability to respond to long-term needs.

Opportunities Observed

The Human Factors sub-committee had two briefings on the Safety Management System (SMS) and sees this SMS as having the potential for a significant impact on the conduct of Human Factors R, D and E in the future.

1. The Safety Management System provides an opportunity for Human Factors and is a good investment. The Safety Management System could allow Human Factors to be embedded in the system engineering life cycle process. Early embedding is the way that Human Factors people perform most effectively to provide value added. If SMS is a new and growing concern at the FAA, then Human Factors involvement is not free. Sufficient resources will be needed to ensure that the best use is made of Human Factors input at early stages, rather than waiting until human/system mismatch errors become obvious and costly redesign is needed.
2. There are external drivers, such as changing concept of operations, NAS modernization, UAVs, changing staffing at ATC, and FAA business model. How can we turn these drivers into opportunities for good Human Factors involvement in a systematic, rather than *ad hoc*, manner?

Recommendations

1. Implement a strategy to ensure that Human Factors is incorporated and sustained in research and acquisition programs in the new environment of ATO.
2. Implement a strategy to fully integrate human factors considerations and human performance measures into the technical performance, management, and oversight of the Safety Management System.

3. Ensure that human performance data is collected and applied to provide data-driven decision capabilities to support such activities as standard definitions of human-system performance for TRLs, human intellectual capital management and development, system requirements development, criteria for source selection evaluations, and human-system performance measures in tests and evaluations.

Subcommittee on Environment and Energy

Inter-Agency Coordination

•Observation:

- There have been significant changes within the JPDO (staffed partly by AEE) to ensure that the environmental impact of aviation is addressed.
- However, there is great concern that the AEE resources (particularly staffing) required to fully participate in future efforts would require the shifting of resources away from other critical efforts.

•Recommendation:

- Administrator should estimate resources (particularly staffing) required from AEE to fully participate in future JPDO efforts and make the appropriate allocations so that resources are not shifted away from other critical efforts.

•Recommendation:

- Determine appropriate mechanisms for REDAC Environment and Energy sub-committee to coordinate with the appropriate DOT, DOE, and EPA environmental research advisory committees.
- Set-up the appropriate internal structures (within the agencies) to coordinate environmental research and policy.

AEDT-APMT

•Observation

- AEE has made considerable progress in advancing analytical tool development

•Recommendations:

- Refine local and global cost components of the Environmental Design Space (EDS) within AEDT.
- Carefully assess the level of validation and verification needed for cost components.

Budgetary Issues

•Recommendations:

- Increase resources for APMT (either through direct appropriation or through increased MITRE involvement) to ensure that the US meets requirements for CAEP.
- Provide appropriate resources to expand particulate matter (PM) and hazardous air pollutant (HAP) measurement activities.